REMARKS

This Amendment is responsive to the Office Action dated April 12, 2006. Applicants have amended claims 1, 7, 12, 19, 28, 29, 32 and 34. Claims 1-43 and 50-53 remain pending.

In the Office Action, the Examiner rejected claims 1-43 and 50-53 under 35 U.S.C. 103(a) as being unpatentable over Manchester et al. (USPN 6,822,960) (hereafter Manchester) in view of Stiles et al. (USPN 6,990,121) (hereafter Stiles). In this Amendment, Applicants have amended several of the independent claims to further clarify the inventions relative to the prior art. Applicants respectfully traverse the rejections to the extent such rejections may be considered applicable to the claims as amended. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

The current rejections are improper for several reasons. First, contrary to the Examiner's comments, nothing Manchester discloses or suggests anything related to multi-link protocols, as required by various claims. Second, nothing in any of the applied references discloses or suggests a multi-link service card that facilitates sequencing or fragmentation of data blocks within a network device according to a multi-link protocol, as recited in various claims. Third, nothing in either Manchester or Stiles suggests receiving packets via one interface card, forwarding such packets to a different card (the multi-link service card) within the network device for sequencing or fragmentation, where the service card is specified within the packets as a destination, and then sending the sequenced or fragmented packets from the multi-link service card back to one or more interface cards for transmission on the network. Fourth, the Examiner has failed to establish a prima facie case of obviousness with respect to numerous features of Applicants' dependent claims. Fifth, the Examiner failed to examine features of some of the independent claims (such as claim 50) that differ substantially from the features of claim 1.

In this response, Applicants have amended several of the independent claims to provide clarification regarding a multi-link protocol, and what is required by this feature. In particular, each of independent claims 1, 7, 12, 19, 29 and 34 have been amended to clarify that invention relates to data processing according to a multi-link protocol that allows multiple physical links to be treated by the network device as a single logical link. Furthermore, these claims have also

been amended to clarify that the invention concerns a multi-link service card that facilitates support of the multi-link protocol by the network device. According to the pending claims, packets are received via one interface card, forwarded to a different card (the multi-link service card) within the network device for sequencing or fragmentation, and then sent from the multi-link service card back to one or more interface cards for transmission on the network. Nothing in Manchester or Stiles discloses or suggests these features. Indeed, the primary reference (Manchester) teaches asynchronous transfer mode (ATM) communication and Time Division Multiplexing (TDM) communication for which multi-link fragmentation or sequencing is inapplicable altogether.

In the Office Action, the Examiner addressed the limitations of independent claim 1, but then simply characterized the other independent claims as "containing similar limitations." Applicants do not acquiesce to these characterizations by the Examiner, and submit that this oversimplification caused the Examiner to ignore several key limitations of various claims. The following comments first address claim 1 and some limitations of claim 1 that are common to several other independent claims. Applicants then address many key limitations of various other claims, such as claim 50 which requires packet prioritization in a service card of a network device.

Claim 1 recites a method comprising receiving data packets from a plurality of links in one or more interface cards of a network device according to a multi-link protocol that allows multiple physical links to be treated by the network device as a single logical link; prior to sequencing the data packets in the network device, performing a first routing operation to forward the data packets from the one or more interface cards to a multi-link service card of the network device in accordance with routing information that reflects a topology of a computer network, wherein the routing information identifies the multi-link service card as a destination for the data packets; sequencing the data packets with the multi-link service card of the network device according to the multi-link protocol, wherein the multi-link service card of the network device facilitates support of the multi-link protocol by the network device; and performing a second routing operation in accordance with the routing information to forward the sequenced data packets to the interface cards of the network device for communication over the computer network.

In the Office Action, the Examiner characterized Manchester as disclosing receiving a set of fragments from a plurality of links in one or more interface cards according to a multi-link protocol, the set of fragments collectively composing an unsequenced data packet. Applicants have reviewed the passages cited by the Examiner for these features, however, and such passages of Manchester do not even remotely discuss anything related to multi-link protocols nor the reception of fragments of an unsequenced data packet according to a multi-link protocol. For example, Manchester relates to an asynchronous transfer mode (ATM) switch, which is totally unrelated to multi-link protocols that allow multiple physical links to be treated by the network device as a single logical link. Moreover, contrary to the Examiner's analysis, Manchester does not disclose or suggest receiving a set of fragments from a plurality of links in one or more interface cards according to a multi-link protocol, the set of fragments collectively composing an unsequenced data packet. On the contrary, it is well known that ATM communication involves the transfer of traffic in a synchronous (non-fragmented) manner, and that the ATM does not typically utilize a multi-link protocol nor use sets of fragments that collectively form an unsequenced data packet. There is nothing to suggest that Manchester deals with multiple links treated as a single, virtual link where packets of the links are sequenced. For each of these reasons, the current rejections of claim are improper. To aid examination, in this Amendment, Applicants have amended claim 1 to clarify that the multi-link protocol allows multiple physical links to be treated by the network device as a single logical link, which should further distinguish Manchester.

In the Office Action, the Examiner also characterized Manchester as disclosing performing a first routing operation to send the fragments to a multi-link service card for sequencing in accordance with routing information identifies the multi-link service card as a destination for the data packets. This characterization of Manchester is also erroneous, particularly in view of the claim amendments which clarify that the multi-link service card facilitates support of the multi-link protocol by the network device.

Again, Manchester relates to an ATM switch and does not describe any form of a multi-link protocol that allows multiple physical links to be treated by the network device as a single logical link. Along these lines, Manchester clearly fails to suggest any type of multi-link service

card, much less a multi-link service card facilitates support of the multi-link protocol by the network device.

The only sequencing contemplated by the cited passages of Manchester appears to be sequencing of ATM "cells" that are sent in an inverse multiplex ATM (IMA) format. Such sequencing, however, is not multi-link sequencing of fragments of a packet, nor is such sequencing performed in a multi-link service card, as required by Applicants claims. Again, the amendment to claim 1 to specifically require the multi-link protocol to allow multiple physical links to be treated by the network device as a single logical link, should make these distinctions more clear for the Examiner.

The Stiles reference provides no teaching that would remedy these basic deficiencies Manchester described above. Furthermore, a person of ordinary skill in the art would not have considered any modification of Manchester in view of Stiles, as these references concern totally different issues.

While the Stiles reference may contemplate multi-link packet processing, Stiles appears to disclose nothing more than conventional packet processing that occurs within each respective line card. In other words, according to Stiles, each line card includes its own packet processing circuitry 212, which would perform any respective packet protocol supported by the respective card.

Unlike Applicants' claims, however, Stiles fails to disclose or suggest any technique or device in which packets received via one interface card are forwarded to a different card (the multi-link service card) within the network device for sequencing or fragmentation, and then sent from the multi-link service card back to one or more interface cards for transmission on the network. As outlined in Applicants' specification, these features allow for scalability and backward compatibility of multi-link protocols in a network device without needing to replace each respective line card. Instead, a multi-link service card is implemented to handle multi-link functionality for packets received from other interface cards, which may not themselves include such multi-link processing capabilities.

Applicants have further clarified the pending claims to distinguish Stiles in several respects. In particular, the pending claims have been amended to clarify that the forwarding, fragmentation, and/or sequencing according to the multi-link protocol occurs entirely within the

network device (e.g., entirely within a router). In Stiles, information is transferred between different in-ring elements, e.g., between different in-ring routers or switches. Accordingly, this clarification that the forwarding, fragmentation, and/or sequencing according to the multi-link protocol occurs entirely within the network device should help the Examiner recognize distinctions between the claims and the prior art.

Moreover, unlike the current claims, in Stiles, each respective card must include its own packet processing circuitry. According to the pending claims, in contrast, packets received via one interface card are forwarded to a different card (the multi-link service card) within the network device for sequencing or fragmentation, and then sent from the multi-link service card back to one or more interface cards for transmission on the network.

In addition to these distinctions, Applicants also submit that the Examiner's proposed modifications to Manchester in view of Stiles would not have been obvious to a person of ordinary skill in the art. To be sure, Manchester is directed to an ATM switch, while Stiles concerns a network of elements that cooperate in an in-ring environment. Thus, it is difficult to understand how the in-ring environment would even be applicable to a single ATM switch, such as that taught by Stiles. Moreover, Manchester is not even concerned with multi-link protocols, whatsoever, and therefore, a person of ordinary skill in the art would have found no reason to modify Manchester to include such functionality that would be inapplicable to the ATM communication used by Manchester.

Given that Manchester is not related to multi-link protocols, whatsoever, a person of ordinary skill in the art would have avoided implementing any of the multi-link functionality of the ring-based Stiles system into the Manchester device. Such functionality would be inapplicable to the ATM communications supported by Manchester. Furthermore, even if the architecture of Stiles were implemented into the switch of Manchester, neither reference discloses or suggests packets being received via one interface card, forwarded to a different card (the multi-link service card) within the network device for sequencing or fragmentation, and then sent from the multi-link service card back to one or more interface cards for transmission on the network.

For at least these reasons, all of claims 1, 7, 12, 19, 29 and 34 should be in condition for immediate allowance. Again, these claims all generally require packets being received via one

interface card, forwarded to a different card (the multi-link service card) within the network device for sequencing or fragmentation, and then sent from the multi-link service card back to one or more interface cards for transmission on the network.

A number of dependent claims recite additional features that are not disclosed or suggested in the applied references. As one example, dependent claim 2 requires that multi-link service card is not directly coupled to any of the links. In rejecting this claim, the Examiner cited passages of Manchester. Unfortunately, however, Manchester appears to actually disclose the antithesis of this feature of claim 2. In particular, Manchester specifically states that "each line card 40 includes on or more external interfaces or ports 48... and that the ports 48 receive ingress traffic from an external line and/or transmit egress traffic received by the internal interfaces 50." Thus, it appears that contrary to dependent claim 2, Manchester contemplates line cards that are each coupled to links. Similarly, each network element described in Stiles appears to include it own physical connection circuitry that is coupled to an external line (See FIG. 2).

As another example, dependent claims 5, 11, 14, 28 and 36 further recite fragmentation of the sequenced data. In these cases, the claims generally require packets being received via one interface card, forwarded to a different card (the multi-link service card) within the network device for sequencing, forwarded back to the service card for subsequent re-fragmentation according to the multi-link protocol, and then sent from the multi-link service card back to one or more interface cards for transmission as fragments on the network. The passages of Manchester cited by the Examiner in rejecting these claims do not even disclose anything remotely similar to these specific features. Applicants are generally perplexed as to how the Examiner thinks ATM communication per Manchester is even remotely similar to the claimed features that require packets being received via one interface card, forwarded to a different card (the multi-link service card) within the network device for sequencing, forwarded back to the service card for subsequent re-fragmentation according to the multi-link protocol, and then sent from the multi-link service card back to one or more interface cards for transmission as fragments on the network, per dependent claims 5, 11, 14, 28, 36.

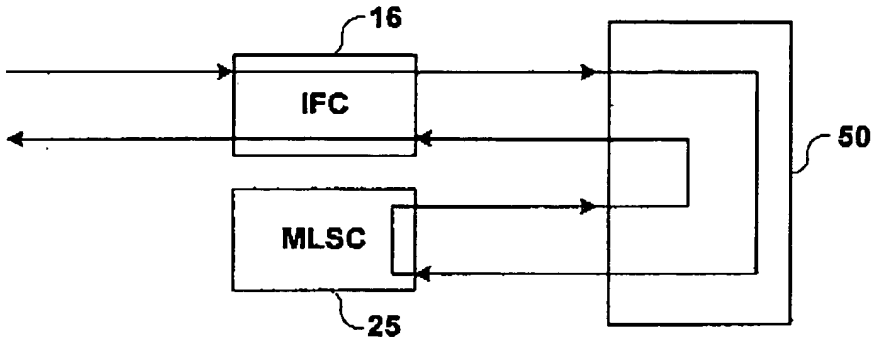
Applicant also wishes to comment on independent claim 50, which is very different from claim 1. Independent claim 50 recites receiving data packets in one or more interface cards of a network device, performing a first routing operation in accordance with routing information to

send the data packets to a service card of the network device for prioritization, and performing a second routing operation in accordance with the routing information to send the prioritized data packets to the interface cards of the network device for communication to a destination device over a computer network.

In rejecting claim 50, the Examiner referred to the analysis of claim 1. However, unlike claim 1, claim 50 requires the service card to perform prioritization of the packets. Thus, according to claim 50, packets are received by one or more interface cards, routed to a service card of the same device for prioritization, and then re-routed to the interface cards or communication to a destination device over a computer network. The Examiner failed to even address this prioritization, per claim 50, which is also lacking from Manchester and the other applied references. Such prioritization, for example, can be very useful to ensure quality of service (QoS) for certain packet types. In any case, neither Manchester nor Stiles suggests this feature.

In conclusion, Applicants wish to again provide the Examiner with a brief summary of the claimed inventions. The separate interface cards (IFCs) and multi-link service cards (MLSC) can be seen, e.g., in FIG. 5B of Applicants' disclosure is reproduced below.

FIGURE 5B



Applicants' claimed inventions are generally directed to a router or other network device having interface cards for sending and receiving multi-link network communication protocols. According to the pending claims (and not shown in any of the prior art to date), the claimed inventions require a separate service card (a multi-link service card 25) that can be selectively added to the router for resequencing the communications. The service card may not itself receive packets directly from any links, but may comprise a network address that resides solely within

the router for purposes of supporting multi-link protocols for packets received from other interface cards (which may not otherwise support sequencing or fragmentation according to such multi-link protocols).

In other words, as shown in FIG. 5B (above), interface card 16 and multi-link service card 25 are distinct structural cards of the router. Interface card 16 receives a set of data blocks from a source within a computer network according to a multi-link protocol. Routing control unit 50 is coupled to the interface card 16 and multi-link service card 25. Routing control unit 50 forwards the set of data blocks from the interface card 16 to the multi-link service card 25 for sequencing. The use of a separate multi-link service card to sequence packets sent according to a multi-link protocol allows a router to be upgraded to include the multi-link service functionality via a distinct card, e.g., that can be inserted or removed from the router (see dependent claim 53).

To date, the Examiner has failed to identify any teaching that suggests a single network device (such as a router) that receives packets one interface card 16 , forwards such packets (via routing engine 50) to a different card (the multi-link service card 25) within the network device for sequencing or fragmentation, and then sends the sequenced or fragmented packet from the multi-link service card 25 back to one or more interface cards 16 for transmission on the network. In other words, the data path illustrated in FIG. 5B above, should help the Examiner recognize how the current claims require forwarding from one interface card, through a multi-link service card, and out the interface card. Neither Manchester nor Stiles suggests these features. Again, Manchester does not even concern multi-link protocol routing, and Stiles teaches conventional line cards that each perform the packet processing solely in that respective card.

Applicants have made ample attempts to amend the claims in a manner to sufficiently clarify these novel aspects for the Examiner, but still feel that the claims (even as originally filed) recite these patentable features over the prior art that the Examiner has relied upon to date. If any future discussions would be helpful for the Examiner, the Examiner is invited to contact the attorney signed below.

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims.

In view of the distinctions addressed above between the current claims and the applied prior art, Applicants reserve further comment at this time on any other features of the independent or dependent claims. However, Applicants do not necessarily acquiesce in any of the rejections or the Examiner's interpretations of the applied references. Applicants reserve the right to present addition arguments with respect to any of the independent or dependent claims.

Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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